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EXAMINER	
SWEARINGEN, JEFFREY R	

ART UNIT	PAPER NUMBER
2145	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/010,881	BARHAM ET AL.	
	Examiner	Art Unit	
	Jeffrey R. Swearingen	2145	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 November 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-53* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-53* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *08 November 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claim 8 is objected to because of the following informalities: Lines 4-5 of claim 8 state *to computer network load and associate load value information...* The Examiner believes this is a typographical error (*associated load value information*) or that Applicant has not defined the association between load and *associate load value information*. The Examiner assumes a typographical error exists. Appropriate correction is required or Applicant is requested to clarify the claim language if the Examiner's assumption is incorrect.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-4, 6, 8-10, 11, 13, 17-20, 22-24, 31, 34, 37, 39-41, 45, and 50-51 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. Claim 1 recites the limitation "the network load information" in claim 1. There is insufficient antecedent basis for this limitation in the claim.

5. Claim 2 recites the limitation "the path" in claim 1. There is insufficient antecedent basis for this limitation in the claim.

6. Claim 3 recites the limitation "the path" in claim 1. There is insufficient antecedent basis for this limitation in the claim.

7. Claim 4 recites the limitation "the path" in claim 1. There is insufficient antecedent basis for this limitation in the claim.

8. Claim 6 recites the limitation "the other packet" in claim 5. There is insufficient antecedent basis for this limitation in the claim.

9. Claim 8 recites the limitation "the value" in claim 8. There is insufficient antecedent basis for this limitation in the claim.

10. Claim 8 recites the limitation "the flow" in claim 8. There is insufficient antecedent basis for this limitation in the claim.

11. Claim 9 recites the limitation "the load value information" in claim 8. There is insufficient antecedent basis for this limitation in the claim.

12. Claim 10 recites the limitation "the load value information" in claim 8. There is insufficient antecedent basis for this limitation in the claim.

13. The term "willingness to pay" in claims 11, 18-20, 22, 37, 39, and 50 is a relative term which renders the claim indefinite. The term "willingness to pay" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Page 9, lines 5-15 give a rough definition of a "willingness to pay", but one of ordinary skill in the art would not be able to use such a definition in order to implement the invention because of the burden of undue experimentation.

14. The term "low congestion" in claim 13 is a relative term which renders the claim indefinite. The term "low congestion" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Applicant has not given any definition of what is meant by "low congestion", and such a term would be relative to one of ordinary skill in the art.

15. The terms "regularly" in claim 17 and "regular" in claim 31 is a relative term which renders the claim indefinite. The term "regularly" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. One of ordinary skill in the art would suffer from the burden of undue experimentation attempting to implement Applicant's claimed invention while trying to ascertain what Applicant intended by a "regular" update.

16. The term "a fraction" in claims 23-24 and 40-41 is a relative term which renders the claim indefinite. The term "a fraction" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

17. The term "a time interval" in claim 45 is a relative term which renders the claim indefinite. The term "a time interval" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

18. The term "variable" in claim 34 is a relative term which renders the claim indefinite. The term "variable" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

19. In regard to claim 51, the Examiner is unclear if the router is in fact controlling the packets being sent to the destination to control the rate of acknowledgement, controlling the acknowledgement packets being returned to the source to control the rate of acknowledgement, or using another unknown method to "control the rate of acknowledging the receipt of packets by the computing device."

Claim Rejections - 35 USC § 102

20. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

21. Claims 1-2, 4-6, 8, 10, and 52-53 are rejected under 35 U.S.C. 102(e) as being anticipated by Davies et al. (U.S. Patent No. 6,483,805).

22. In regard to claim 1, Davies discloses *receiving load information corresponding to network load, at a source of network packets, wherein the network load information is determined by network traffic, and controlling a rate of a flow of packets at the source based on the load information and a weight value associated with the flow.* Davies allows a router to keep track of packet transactions and statistical information to limit the number of transactions by use of flow control mechanisms. Davies states that the statistical distribution information used is based on classes of transactions. Classes of transactions would be a *weight value associated with the flow* and the packet transaction information is *network load information determined by network traffic.* See Davies, column 8, lines 9-24, 29-40, 43-46, 53-56, 62-65. Since the TCP flow control (lines 62-67) inherently sends the flow control information to the source, it *controls a rate of a flow of packets at the source.*

23. In regard to claim 2, Davies is applied as in claim 1. Davies further discloses *the load information comprises a load estimate computed by at least one router in the path from the source to a destination node.* As a packet passes through a router (*at least one router in the path from the source to a destination note*) in a network, the router monitors and collects information on transactions. See Davies, column 8, lines 29-40.

24. In regard to claim 4, Davies is applied as in claim 1. Davies further discloses *the load information is provided by at least one router in the path from the source to a destination node.* As a packet passes through a router (*at least one router in the path from the source to a destination note*) in a network, the router monitors and collects information on transactions. See Davies, column 8, lines 29-40.

25. In regard to claim 5, Davies is applied as in claim 4. Davies further discloses *the load information is placed by a router into a packet sent by the source, received at the destination node, and returned to the source via another packet from the destination node.* Davies teaches that TCP in the Davies invention provides end-to-end flow control in column 8, lines 62-64. The manipulation of the rate and the load information would therefore be sent by TCP to both the destination and source based upon the functionality of the Davies invention and TCP conventions.

26. In regard to claim 6, Davies is applied as in claim 5. Davies further discloses *the other packet comprises an acknowledge packet sent from the destination node to the source.* As shown in the rejection for claim 5, TCP controls sending the rate and load and QoS information end-to-end in a flow. TCP sends acknowledgements, and the way that TCP would return such information would be in the window size and header parameters of a TCP acknowledgement packet to the source node.

27. In regard to claim 8, Davies discloses *a source of a flow of data, a destination node that receives at least some of the flow of data from the source, a router between the source and destination that is configured to computer network load and associate load value information corresponding to the network load with the data, a mechanism configured to provide the value corresponding to the network load to the source, and the source including a mechanism that controls a rate of the flow of further data based on the value corresponding to the network load and a weight associated with the flow.* This claim is substantially the same as claim 1; therefore Davies is applied against claim 8 as in claim 1.

28. In regard to claim 10, Davies is applied as in claim 8. Davies discloses supplying QoS through TCP in an end-to-end flow control manner as previously shown. As shown in the rejections to claims 5-6, TCP can *provide the load value information at the destination and to the source in a communication from the destination to the source.*

29. In regard to claim 52, Davies discloses *receiving load information corresponding to network load at a destination of network packets, wherein the network load information is determined by network traffic, and controlling a rate of a flow of packets to the destination based on the load information and a weight value associated with the flow.* See claim 1, which has the same substantial claim limitations as claim 52.

30. In regard to claim 53, Davies is applied as in claim 52. Davies further discloses *controlling a rate of a flow of packets to the destination comprises controlling a rate of acknowledging packets received from a source.* This is part of the TCP flow control mechanisms (column 8, line 45) which are used in Davies by implementing control of the window size. See Davies, column 8, line 43- column 9, line 44 for an in-depth explanation of this process.

Claim Rejections - 35 USC § 103

31. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

32. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Davies.

33. In regard to claim 7, Davies is applied as in claim 1. Davies teaches in column 8 the control of QoS for a packet flow based on weight (QoS, class) and load (transactions currently in progress, network load). It would be obvious to use the functions of weight and load in many ways to adjust the rate of a network flow, including *adjusting the rate proportional to the weight value and inversely proportional to the load information*, to allow for commercial success in implementing a product that will best suit the individual client network user's needs for performance.

34. Claims 3 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Davies in view of Zikan et al. (U.S. Patent No. 6,310,881).

35. In regard to claim 3, Davies is applied as in claim 1. Davies fails to disclose combining load estimates made by multiple routers in a network path. However, Zikan, in the same field of endeavor of routing packets based on load, describes the aggregation of information between router modules for QoS information to reduce the amount of information stored in a router. See Zikan, column 11, lines 35-55; column 12, lines 35-67. Davies does disclose routers which form statistical estimates of the load information in column 8, lines 35-40, which is analogous to the QoS information stored and aggregated in Zikan. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the Davies invention with the teachings of Zikan for the purpose of reducing the amount of information stored in a router (Zikan, column 11, lines 35-37), which would therefore improve router

processing speed and decrease data latency and delay in the router. Davies gives support for this combination in column 1, lines 14-20 and column 3, lines 14-20.

36. In regard to claim 9, Davies is applied as in claim 8. The rationale provided for the combination of Davies and Zikan in claim 3 is also applicable to claim 9. Herein, the claim limitation of an additional router adjusting load value information before providing said information to the source is equivalent to the steps taken by Zikan to aggregate router QoS load information by multiple routers in a path. Therefore, applying the rejection and motivation of claim 3, it would have been obvious to one of ordinary skill in the art to modify the Davies invention with the teachings of Zikan as shown previously in the rejection of claim 3.

37. Claims 11-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Davies in view of Krishnamurthy et al. (U.S. Patent No. 6,910,024).

38. In regard to claim 11, Davies discloses *obtaining price information corresponding to network load at the computer system, the price information being determined by actual network traffic relative to network capacity; and controlling a rate of transmitting data on the network based on the price information and a value representative of a willingness to pay.* A *willingness to pay* can be taught in a Service Level Agreement (Davies, column 7, lines 38-52), which inherently defines a contract between the user and the provider for guaranteed service for a particular class in exchange for payment by the user. The pricing information, although not taught in Davies, is taught in Krishnamurthy in the same field of endeavor of controlling rates of traffic based on load. Krishnamurthy discloses setting pricing for particular QoS levels based on current route load information, or *obtaining price information corresponding to network load at the computer system, the price information being determined by actual network traffic relative to network capacity.* See Krishnamurthy, column 3, lines 45-58, column 4, lines 26-65. Therefore it would have been obvious to one of ordinary skill in the art to modify the Davies invention with the pricing teachings of Krishnamurthy for commercial success as well as controlling the available resources of the network based upon who is willing to pay for those resources. (Krishnamurthy, column 4, lines 21-25) Davies supports this combination in column 3, lines 14-20 and column 2, lines 19-22.

39. In regard to claim 12, Davies in view of Krishnamurthy is applied as in claim 11. As shown in Krishnamurthy, column 4, lines 55-65, the core router (*another computer system on the network*) provides the price information.

40. In regard to claim 13 as best understood by the Examiner, Davies in view of Krishnamurthy is applied as in claim 12. Krishnamurthy further discloses *measuring the actual network traffic as a fraction of the network capacity which can be served with low congestion*, or making a reservation for network resources based on current network load and flow information and resources demanded by a required QoS level. See Krishnamurthy, column 4, lines 26-67.

41. In regard to claim 14 as best understood by the Examiner, Davies in view of Krishnamurthy is applied as in claim 13. Krishnamurthy further discloses *the fraction comprises a threshold value, and wherein the other computer system determines the price information by measuring the actual network traffic, and increasing a previous price if the actual network traffic relative to network capacity is greater than a threshold value, or decreasing the previous price if the actual network traffic relative to network capacity is less than the threshold value.* As shown in Krishnamurthy, column 20, lines 30-67, the price of network bandwidth will be increased or decreased based on the amount of bandwidth being used in the system based upon available supply and demand, and using fixed and predictable costs when necessary.

42. In regard to claim 15, Davies in view of Krishnamurthy is applied as in claim 14. Krishnamurthy details an example sliding scale for pricing in a congested network in Figure 9. One of ordinary skill in the art, based upon this figure, would find it obvious that the congestion pricing could be accomplished by multiplying a price by a factor in order to obtain a new price on the scale shown in Figure 9 of Krishnamurthy.

43. In regard to claim 16, Davies in view of Krishnamurthy is applied as in claim 12. Krishnamurthy further discloses *the other computer system broadcasts the price information*, or the core router provides the price information as shown previously in the rejection of claim 12.

44. In regard to claim 17, Davies in view of Krishnamurthy is applied as in claim 12. Krishnamurthy further discloses *the other computer system regularly updates the price information.* Krishnamurthy,

column 22, lines 1-22 details that the price can change based upon the current amount of users and a REFRESH packet to inform about current prices.

45. In regard to claim 18, Davies in view of Krishnamurthy is applied as in claim 11. Krishnamurthy discloses various methods of establishing price information for a network based upon the amount of service a user is "willing to pay" for and establishing a rate for said QoS level. It would have been obvious to one of ordinary skill in the art to use any type of mathematical equation using such factors to establish a rate based upon what the current price of the network is and what the user is willing to pay for, including the suggested equation of *the willingness value divided by the price information.*

46. In regard to claim 19, Davies in view of Krishnamurthy is applied as in claim 11. Davies further discloses *controlling a rate of transmitting data includes, obtaining the value representative of the willingness to pay for a selected application, and controlling the transmit rate for the selected application based on that willingness value and the price information.* The control of the *transmit rate for the selected application based on that willingness value and the price information* is substantially the same as *controlling a rate of a flow of packets at the source based on the load information and a weight value associated with the flow.* Each of the *selected applications* is a service class of traffic, as defined by the Service Level Agreement and the "router can be provided with statistical distribution information characterizing the nature of transactions of that [traffic] class" (Davies, column 8, lines 22-24) is *obtaining the value representative of the willingness to pay for a selected application.*

47. In regard to claim 20, Davies in view of Krishnamurthy is applied as in claim 11. Davies further discloses *controlling a rate of transmitting data includes, obtaining the value representative of the willingness to pay for each of a plurality of selected applications, and for each application, controlling the transmit rate based on the application's respective willingness value and the price information.* This claim is substantially the same as claim 19. Claim 19 deals with one *selected application*; whereas claim 20 deals with *a plurality of selected applications.* Davies teaches dealing with multiple classes of traffic, or *a plurality of selected applications.* See Davies, column 8, lines 10-21. This is further supported in Krishnamurthy, column 4, lines 50-67 and column 5, lines 38-51.

48. In regard to claim 21, Davies in view of Krishnamurthy is applied as in claim 20. Krishnamurthy discloses the use of different port numbers for broadcasting traffic in column 4, line 17. Krishnamurthy discloses marking data packets of different data flows in column 4, lines 50-65. Different port numbers are used for different applications, and different data flows likewise are used for different applications based upon said port numbers. Each data flow according to Krishnamurthy, column 4, lines 50-65 can be assigned a different status and QoS requirement. The price can control the transmission rate of a QoS level as previously shown in Krishnamurthy. It would be obvious to one of ordinary skill in the art that if one could use price information to control data flow rates in Krishnamurthy, and that if Krishnamurthy supports multiple data flows, that one could implement Krishnamurthy with multiple data flows and not regulate the data flow rate on all of the data flows using price information. The motivation for one of ordinary skill in the art to do this would be based upon consumer needs and demands, as shown in Krishnamurthy, column 4, lines 21-25, which states the price and or data importance can be used in determining rate of a data flow.

49. In regard to claim 22, Davies in view of Krishnamurthy is applied as in claim 20. Krishnamurthy discloses the use of different port numbers for broadcasting traffic in column 4, line 17. Krishnamurthy discloses marking data packets of different data flows in column 4, lines 50-65. Different port numbers are used for different applications, and different data flows likewise are used for different applications based upon said port numbers. Each data flow according to Krishnamurthy, column 4, lines 50-65 can be assigned a different status and QoS requirement. The price can control the transmission rate of a QoS level as previously shown in Krishnamurthy. It would be obvious to one of ordinary skill in the art that if one could use price information to control data flow rates in Krishnamurthy, and that if Krishnamurthy supports multiple data flows, that one could implement Krishnamurthy with multiple data flows and not regulate the data flow rate on all of the data flows using price information. The motivation for one of ordinary skill in the art to do this would be based upon consumer needs and demands, as shown in Krishnamurthy, column 4, lines 21-25, which states the price and or data importance can be used in determining rate of a data flow. It would be further obvious to one of ordinary skill in the art to use both a

fixed rate and a price rate in determining transmission rate in Krishnamurthy, based upon Krishnamurthy, column 4, lines 21-25.

50. In regard to claim 23, Davies in view of Krishnamurthy is applied as in claim 22. *A fraction of the network capacity being used by at least one application* does not further limit the reading of this claim beyond the limitations already shown in claims 20-22 because a fraction can be the entire amount of the usage of the application. A *fraction* is a portion of a number, and the entire number is a portion of the number, albeit the entire portion of the number. Therefore this claim is rejected using the rationale previously shown in claim 22.

51. In regard to claim 24, Davies in view of Krishnamurthy is applied as in claim 23. The smoothing of prices is shown in Krishnamurthy, column 22, lines 53-66, where fixed, relative prices are used at times to prevent constantly changing the cost of sending the data.

52. In regard to claim 25, Davies in view of Krishnamurthy discloses *an observer mechanism that determines network demand; a pricing mechanism configured to determine a price based on the network demand and network capacity data, the pricing mechanism further configured to provide price information corresponding to the price to at least one device on the network; and a rate control mechanism configured to receive the price information and to control at least one transmit rate based on the received price information.* Davies in view of Krishnamurthy is applied against claim 25 as in claim 11, since the claim limitations are substantially the same.

53. In regard to claim 26, Davies in view of Krishnamurthy is applied as in claim 25. Davies further discloses *the observer mechanism is incorporated into a computing device on the network.* The *observer mechanism* in Davies *determines network demand*, such as in Davies, column 8, lines 25-52, which describes a router tracking packet streams and transactions and combining collected data with statistical distributions to form a "statistical estimate of the current load on the network, and specifically the load on the next link in the network along which that data is transmitted", otherwise known as *determin[ing] network demand.*

54. In regard to claim 27, Davies in view of Krishnamurthy is applied as in claim 26. Davies further discloses *the computing device comprises a router*. See the rejection of claim 26, which shows that the *observer mechanism* in Davies is incorporated into a router.

55. In regard to claim 28, Davies in view of Krishnamurthy is applied as in claim 26. Davies and Krishnamurthy both utilize routers. However, gateways are a common type of router. Therefore it would be obvious to use any type of router with the Davies and Krishnamurthy combination, including a gateway.

56. In regard to claim 29, Davies in view of Krishnamurthy is applied as in claim 26. Krishnamurthy has already shown in the previous rejections in this action that the core router determines the pricing, which also determines the demand on the core router.

57. In regard to claim 30, Davies in view of Krishnamurthy is applied as in claim 25. Krishnamurthy further discloses *broadcasting the price information on the network*, or the core router provides the price information as shown previously in the rejection of claim 12.

58. In regard to claim 31, Davies in view of Krishnamurthy is applied as in claim 30. Krishnamurthy further shows *providing the price information at regular intervals*. Krishnamurthy, column 22, lines 1-22 details that the price can change based upon the current amount of users and a REFRESH packet to inform about current prices.

59. In regard to claim 32, Davies in view of Krishnamurthy is applied as in claim 25. Krishnamurthy discloses various methods of establishing price information for a network based upon the amount of service a user is "willing to pay" for and establishing a rate for said QoS level. It would have been obvious to one of ordinary skill in the art to use any type of mathematical equation using such factors to establish a rate based upon what the current price of the network is and what the user is willing to pay for, including the suggested equation of *dividing a value representative of the network demand by the network capacity data.*

60. In regard to claim 33, Davies in view of Krishnamurthy is applied as in claim 32. It would be obvious to one of ordinary skill in the art that one way of operating a network would be to maintain the

current amounts of equipment and bandwidth, thereby yielding a fixed network capacity for the Davies invention with the modifications taught by Krishnamurthy.

61. In regard to claim 34, Davies in view of Krishnamurthy is applied as in claim 32. It would be obvious to one of ordinary skill in the art that one way of operating a network would be to expand the network to allow more customers to utilize it by adding equipment and bandwidth, thereby yielding a change in the network capacity, or making the network capacity *variable*.

62. In regard to claim 35, Davies in view of Krishnamurthy is applied as in claim 32. Krishnamurthy further discloses keeping track of the amount of consumed network resources (column 5, line 56) and doing so over certain time periods (column 6, lines 56-67). This is *the value representative of the network demand comprising a number of bytes of network traffic per unit time*.

63. In regard to claim 36, Davies in view of Krishnamurthy is applied as in claim 35. Krishnamurthy keeps track of consumed network resources as previously shown. Packet overhead would inherently be a consumed network resources, and would have been kept track of in the Krishnamurthy invention as shown in column 5, line 56.

64. In regard to claim 37, Davies in view of Krishnamurthy is applied as in claim 25. Davies further discloses *an application program, and wherein the rate control mechanism controls a transmit rate for the application based on a willingness to pay value associated with the application program and the received price information*. See the rejections of claim 11 and 19 with Davies in view of Krishnamurthy.

65. In regard to claim 38, Davies in view of Krishnamurthy is applied as in claim 37. Krishnamurthy discloses the use of different port numbers for broadcasting traffic in column 4, line 17. Krishnamurthy discloses marking data packets of different data flows in column 4, lines 50-65. Different port numbers are used for different applications, and different data flows likewise are used for different applications based upon said port numbers. Each data flow according to Krishnamurthy, column 4, lines 50-65 can be assigned a different status and QoS requirement. The price can control the transmission rate of a QoS level as previously shown in Krishnamurthy. It would be obvious to one of ordinary skill in the art that if one could use price information to control data flow rates in Krishnamurthy, and that if Krishnamurthy supports multiple data flows, that one could implement Krishnamurthy with multiple data flows and not

regulate the data flow rate on all of the data flows using price information. The motivation for one of ordinary skill in the art to do this would be based upon consumer needs and demands, as shown in Krishnamurthy, column 4, lines 21-25, which states the price and or data importance can be used in determining rate of a data flow.

66. In regard to claim 39, Davies in view of Krishnamurthy is applied as in claim 37. Krishnamurthy discloses the use of different port numbers for broadcasting traffic in column 4, line 17. Krishnamurthy discloses marking data packets of different data flows in column 4, lines 50-65. Different port numbers are used for different applications, and different data flows likewise are used for different applications based upon said port numbers. Each data flow according to Krishnamurthy, column 4, lines 50-65 can be assigned a different status and QoS requirement. The price can control the transmission rate of a QoS level as previously shown in Krishnamurthy. It would be obvious to one of ordinary skill in the art that if one could use price information to control data flow rates in Krishnamurthy, and that if Krishnamurthy supports multiple data flows, that one could implement Krishnamurthy with multiple data flows and not regulate the data flow rate on all of the data flows using price information. The motivation for one of ordinary skill in the art to do this would be based upon consumer needs and demands, as shown in Krishnamurthy, column 4, lines 21-25, which states the price and or data importance can be used in determining rate of a data flow. It would be further obvious to one of ordinary skill in the art to use both a fixed rate and a price rate in determining transmission rate in Krishnamurthy, based upon Krishnamurthy, column 4, lines 21-25.

67. In regard to claim 40, Davies in view of Krishnamurthy is applied as in claim 39. *A fraction of the network capacity being used by at least one application* does not further limit the reading of this claim beyond the limitations already shown in claims 20-22 because a fraction can be the entire amount of the usage of the application. A *fraction* is a portion of a number, and the entire number is a portion of the number, albeit the entire portion of the number. Therefore this claim is rejected using the rationale previously shown in claim 39.

68. In regard to claim 41, Davies in view of Krishnamurthy is applied as in claim 40. The smoothing of prices is shown in Krishnamurthy, column 22, lines 53-66, where fixed, relative prices are used at times to prevent constantly changing the cost of sending the data.

69. In regard to claim 42, Davies in view of Krishnamurthy is applied as in claim 37. Krishnamurthy further discloses *comparing the network demand to a threshold value, and if the network demand achieves the threshold value, increasing a previous price, and if not, decreasing the previous price.* As shown in Krishnamurthy, column 20, lines 30-67, the price of network bandwidth will be increased or decreased based on the amount of bandwidth being used in the system based upon available supply and demand, and using fixed and predictable costs when necessary.

70. In regard to claim 43, Davies in view of Krishnamurthy is applied as in claim 25. Davies further discloses *the rate control mechanism comprises protocol code implemented at the Internet Protocol (IP) layer.* Davies uses TCP flow control mechanisms (column 8, line 45) which would inherently work with the IP layer. The IP layer is further shown in the diagrams of the Davies patent (figures 3-6) which describe modifications in an IP datagram to support the Davies invention.

71. In regard to claim 44, Davies in view of Krishnamurthy is applied as in claim 25. Davies further discloses *the rate control mechanism controls the at least one transmit rate by controlling a rate of acknowledging packet receipt.* This is part of the TCP flow control mechanisms (column 8, line 45) which are used in Davies by implementing control of the window size. See Davies, column 8, line 43- column 9, line 44 for an in-depth explanation of this process.

72. In regard to claim 45, Davies discloses a network which supplies QoS based upon network demand. Davies presents this in a Service Level Agreement, as shown in column 7, lines 38-52, where a user would agree to a certain level of network service in exchange for a certain payment. Davies fails to disclose exact pricing information. However, Krishnamurthy discloses determining price values based on network usage over a time period and providing a network price for usage to control rate of transmission from the source. See Krishnamurthy, column 4, lines 26-67. Krishnamurthy discloses the use of time periods based upon periodic control messages to indicate current network status. The accumulated size of packets received during a time interval is shown as per-flow state information and is shown in column

6, lines 34-67 where in a certain period, a router details the number of reservation packets received as well as dealing with current bandwidth usage. Therefore it would have been obvious to one of ordinary skill in the art to combine the Davies invention with the teachings of Krishnamurthy for commercial success as well as controlling the available resources of the network based upon who is willing to pay for those resources. (Krishnamurthy, column 4, lines 21-25) Davies supports this combination in column 3, lines 14-20 and column 2, lines 19-22.

73. In regard to claim 46, Davies in view of Krishnamurthy is applied as in claim 45. The use of routers is taught in both Davies and Krishnamurthy as previously shown. Routers are set by default to receive all packets, and access filters to limit the packets that are received are only initiated as an option by the router administrator. Routers are by default *in a mode that is intended to receive all packets transmitted on the network.*

74. In regard to claim 47, Davies in view of Krishnamurthy is applied as in claim 45. It has been previously shown that both Davies and Krishnamurthy keep track of the amount of network capacity in use. It would be obvious to one of ordinary skill in the art to measure this in a percentage to allow a user to understand the network usage with ease.

75. In regard to claim 48, Davies in view of Krishnamurthy is applied as in claim 45. Krishnamurthy further discloses *increasing a previous price if the threshold is achieved, else decreasing the price.* As shown in Krishnamurthy, column 20, lines 30-67, the price of network bandwidth will be increased or decreased based on the amount of bandwidth being used in the system based upon available supply and demand.

76. In regard to claim 49, Davies in view of Krishnamurthy is applied as in claim 45. Krishnamurthy further discloses *broadcasting price information on the network.* As shown in Krishnamurthy, column 4, lines 55-65, the core router (*another computer system on the network*) provides the price information.

77. In regard to claim 50, Davies in view of Krishnamurthy is applied as in claim 45. Krishnamurthy further discloses *selecting an application program, obtaining a willingness value associated with the application program, and controlling the rate based [on] the willingness value and the price value.* The control of the *transmit rate for the selected application based on that willingness value and the price*

information is substantially the same as *controlling a rate of a flow of packets at the source based on the load information and a weight value associated with the flow.* Each of the *selected applications* is a service class of traffic, as defined by the Service Level Agreement and the "router can be provided with statistical distribution information characterizing the nature of transactions of that [traffic] class" (Davies, column 8, lines 22-24) is *obtaining the value representative of the willingness to pay for a selected application.* Also see Krishnamurthy, column 4, lines 50-67 and column 5, lines 38-51.

78. In regard to claim 51, Davies in view of Krishnamurthy is applied as in claim 45. Davies and Krishnamurthy do not disclose measuring the rate of packet acknowledgements. Davies and Krishnamurthy, however, do measure the rate of packets sent and both use routers that can filter packets based on packet types as previously shown in this action. Therefore it would be obvious to one of ordinary skill in the art that the router filters could be used to track the number of acknowledgement TCP packets sent and compare it to the number of TCP packets sent to computer a rate of acknowledgement.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey R. Swearingen whose telephone number is (571) 272-3921. The examiner can normally be reached on M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rupal Dharia can be reached on 571-272-3880. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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